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## ZOOLOGY.

A PROBABLE CASE OF INSTINCT AT FAULT IN BEES.—While staying for a day at a ranch in the valley of South Platte, in Colorado, a few years ago, I found some excellent honey served upon the ranchman's table. He informed me that he had undertaken to keep bees, but that he had lately had "bad luck" with them, which were new swarms that he had only the year before brought from his former home in Illinois; and he gave me the following account of his experience with them. He said that upon the appearance of flowers in the spring his bees became very active and quickly filled with honey not only the main hives, but all the accessory boxes which he attached to them. The comb was clean and perfect and the honey good. In the midst of the season of abundant flowers he observed that his bees began to diminish in numbers, and while flowers were yet abundant his hives became well nigh depopulated, and few or no new swarms were ever produced. Upon opening some of the forsaken hives he found them filled with comb, nearly or quite every cell of which was filled with honey. The hives seemed to be in excellent condition, and he found no trace of the presence of any enemy of the bees.

I examined one of the opened hives, which yet contained a portion of the honey in its comb, and so far as I could see, its condition entirely agreed with the ranchman's statements. I also observed that his hives had been placed in the midst of many acres which were mostly covered with a natural and luxurious growth of the plant *Clione integrifolia* Torrey & Gray, from the flowers of which the bees had evidently obtained their honey.

I am well aware that the foregoing statements as they were made to me, even when supplemented with such personal observations as I was able to make, are not sufficient to base a scientific conclusion upon; but accepting the statements as true, I offer the following suggestions as probably indicating the cause of the rapid extinction of those bees under circumstances that were apparently the most favorable for their preservation and increase.

The plant upon which the bees worked, *Clione integrifolia*, flowers abundantly and continuously through several months of spring and summer. The flowers are so laden with nectar that one plainly tastes it upon plucking the corollas and sucking the tubes. The distance from the abundant flowers to the hives was so short that the bees could obtain the honey with remarkably little labor.

Packard states that the life of working bees of the first brood of the season is about six weeks. Some apiarists think that during the season of most active labor the life of those bees does not exceed

a month. May it not, therefore, have been the case that the workers to which fell the task of collecting honey brought it in such quantities and, so quickly, that all the comb-cells were filled before the queen had an opportunity to deposit her eggs? If this were the case the swarms necessarily became extinct by the natural limitation of the life of individual bees, because of the failure to keep up their numbers by breeding. In short is not this a case in which the instinctive struggle for existence defeated its object?

I have no intention of drawing a parallel between this case of disastrous results to bee-life under apparently normal and unusually favorable conditions, and a certain phase of human society, but if the foregoing suggestions are of little value for want of scientific verification they are believed to be deserving of consideration from other points of view.—*C. A. White.*

THE CALCAREOUS PLATES OF THE STAR-FISH.—Dr. J. W. Fewkes (*Bulletin Mus. Comp. Zool.*, XVII., 1888) describes at length the development of the calcareous plates in *Asterias*, and compares the results with those furnished by *Amphiura*. The results of the comparison may be tabulated thus:—

<i>Amphiura.</i>	<i>Asterias.</i>
Basals.	Genitals.
Dorso-central.	Dorso-central.
Dorsals.	Dorsals.
Laterals.	Inter-ambulacral.
Terminals.	Terminals.
"Spoon-shaped plates."	Oral Ambulacral.
Orals.	First Inter-brachials.
First and second Adam- bulacral.	{ No Homologues.
Ventrals.	
No Homologues.	{ No Homologues.
	Dorso-laterals and con- nectors.

The madreporic opening is placed on two homologically different plates in *Amphiura* and *Asterias*.

A NEW EARTHWORM.—Under the name *Diplocardia communis*, H. Garman describes (*Bulletin Ill. State Lab. Nat. Hist.*) a new earthworm from Champaign, Ill. This new genus belongs to the family Acanthodrilidæ of Claus, but it differs from the other members of the family in several important characters. Its nearest relation is *Acanthodrilus* of Africa and the Orient. Among the most noticeable features are the absence of a sub-neural vessel, the existence of a double dorsal vessel, the two halves being separated throughout their length, except where they pass through the dissipiments between the somites. Although not mentioned by Mr. Garman, this character of the central circulatory organ pos-

sesses considerable morphological interest when taken in connection with the method of formation of the "heart" in many Arthropods, e.g., Branchipus (Claus) and Oecanthus (Ayers). The paper concludes with a valuable catalogue of the known American species of earthworms, which we summarize here:—

Family LUMBRICIDÆ.—Genus *Tetragonurus* Eisen, *T. pupa* Eisen.—Genus *Allolobophora* Eisen, *A. bæckii* Eisen, *A. riparia* Hoffmann, *A. fætida* Savigny, *A. subrubicunda* Eisen, *A. mucosa* Eisen, *A. turgida* Eisen, *A. tenuis* Eisen, *A. tumida* Eisen, *A. parva* Eisen, *A. nordenskiöldii* Eisen.—Genus *Lumbricus* Linné, *L. herculeus* Sav., *L. rubellus* Hoffmann, *L. purpureus* Eisen.

Family ACANTHODRILIDÆ.—Genus *Diplocardia* Garman, *D. communis* Garman.

Family PLUTELLIDÆ.—Genus *Plutellus* Perrier, *C. heteroporus* Perrier.

Family PERICHÆTIDÆ.—Genus *Perichaeta*. Mr. Garman states that an undetermined species of this oriental genus has been acclimatized in the green houses at Champaign, Ill.

ISOPOD ANATOMY.—B. Rosenstadt (*Biol. Centralbl.* VIII., 452, 1888) describes many points in the anatomy of *Asellus aquaticus* and other Isopods. Besides concise accounts of the vascular, nervous, and digestive systems, the author mentions the existence of a rudimentary antennal gland similar to that found in Apseudes and Praniza. In Asellus he found in addition a convoluted canal on either side of the "stomach," which resembled the "shell-gland" of the Entomostraca. The opening of the gland occurred at the base of the second maxilla, and its lumen contained concretions of urates (so shown by Murexide test); points which demonstrated its homology with the shell-gland of the Entomostraca. This is its first recognition in the Malacostraca, though the author found it later in Porcellio, Idotea, Nesæa, Cymothoa, and Jæra.

THE LARVA OF PROTEUS.—Dr. Ernst Zeller has been so fortunate as to have a *Proteus anguineus* lay seventy-six eggs in captivity, from which in ninety days two larvæ hatched. According to his description in the *Zoologischer Anzeiger* (Bd. XI., p. 570, 1888), the larvæ when hatched were more developed than is the case in Amblystoma and the "Axolotl," and measured 22 mm. in length, of which five belonged to the tail. The general appearance was much like that of the adult. The pale red gills are shorter and less developed than in the adult; the anterior limbs are well developed and three-toed, but the hinder pair are still stump-like. The development of the small black eyes is noticeable, as is also the development of pigment in various regions of the body. A few points are mentioned concerning the embryonic

development, and of the larvæ for two weeks after development, when they possessed two toes to the hind feet.

THE NEST AND EGGS OF THE ALLIGATOR.—Dr. S. F. Clarke thus describes the eggs of the alligator in a recent number of the *Zoologischer Anzeiger*. The eggs and young alligators are such common objects in the shop windows in many of the Southern States, that it appeared to be a simple matter to secure the eggs at the right time and in abundance. It proved, on the contrary, to be very difficult. I was assured by various hunters in Florida that each month from January to September inclusive, was the only month in which the alligators lay their eggs, and this resulted in my having to make two journeys of over twenty-six hundred miles each.

At the time of my first visit, the first week in April, all eggs had been laid, and the ovaries of adult female alligators were full of eggs of all sizes up to 26 mm. in diameter. I returned to Florida June 4th, and found that I was still somewhat early, as the nests were then being built. With the aid of five experienced hunters I at last succeeded in finding, on the 9th of June, a nest, evidently just completed, in which there were twenty-nine eggs. The next day, at a point forty miles further north, a second nest was found with thirty-one eggs. There were many nests found, old and new, but only these two contained eggs.

The nests vary much in size, the largest being about  $2\frac{1}{2}$  metres in diameter at the base, and 80 cm. high in the central part, the whole having the shape of a rounded cone. They are located generally on a slightly elevated place, which is higher by a metre, or slightly more than the surrounding level, and covered with a thick growth of palmettos, mangroves, magnolias, etc. These are called "hummocks" by the natives. On one side of the hummock at least, in some cases on all sides, is a pond from one to two metres in depth, and in the bank, under water, the female alligator digs a cave, which in some cases extends three metres under the hummock, and which is always close to her nest. The nest is made by scratching together a great pile of dead leaves and twigs and humus which forms the surface of the ground, and which is arranged with some care. The inside is made of the more finely divided—almost powdery—material of the deeper layers of the top soil, while the outside, even to the top, is covered with twigs and leaves which are whole or but little broken, and with many of the long, unbroken leaves or needles of the southern pine. The eggs are deposited about 20 cm. from the top, and in the nests were found lying on top of one another, making rows or layers, with the fine humus filling all the interstices. The top of the nest is always exposed to the sun.

Dr. Clarke describes the eggs as very difficult to manipulate, as

the shell membrane is tough, and the white very sticky. Before studying his eggs he took them to Williamstown, Mass., but before arriving there they had undergone a part of their development, and the neural folds had nearly completed their coalescence.

ANATOMY OF BIRDS.—Mr. F. E. Beddard (*P. Z. S.*, London, 1888) gives an account of the alimentary tract and syrinx of *Balaeniceps rex*, from which, and from the previously known osteological peculiarities, he regards this bird, “in fact, as a rather aberrant heron, having no near affinities with the storks, nor to *Scopus*.” In the same volume he has some notes on the visceral anatomy of the penguins and puffins, dealing especially with the oblique septum of these birds, and the morphological and taxonomic conclusions to be drawn therefrom. He is inclined to homologize it in details with a fibrous and even muscular structure found in the crocodile. Dr. R. W. Schufeldt (*Jour. Comp. Anat. and Surgery*, October, 1888) gives a much needed account of the osteology of the Jungle-fowl, *Gallus bankiva*. He also treats of several other important structures in the same bird, which is of especial interest as being the ancestor of all of our domestic fowl. Some thirty process figures illustrate the chief points in the article.

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## ENTOMOLOGY.<sup>1</sup>

COLOR-RELATIONS BETWEEN PUPÆ AND THEIR SURROUNDINGS.—Students of Lepidoptera often observe variations in the color of different pupæ of the same species, that have apparently been caused by the color of the object to which the pupa is attached. Striking instances of these variations came under the observation of the writer during the past summer, when breeding *Papilio asterias*. Pupæ attached to green leaves were bright green in color, while others attached to the sides of a breeding-cage closely resembled in color the wood upon which they were.

This class of phenomena has been made the subject of careful study by several English entomologists. The more important of the papers published are two in number. The first, by Mr. E. B. Poulton,<sup>2</sup> was read before the Royal Society of London last year. Since that time Mr. George C. Griffiths has carried the matter farther, and the results of his experiments have just been published by Mr. William White.<sup>3</sup>

<sup>1</sup> This Department is edited by Prof. J. H. Comstock, Cornell University, Ithaca, N. Y., to whom communications, books for notice, etc., should be sent.

<sup>2</sup> Philosophical Transactions, Vol. clxxviii., B., 1887, pp. 311-441.

<sup>3</sup> Trans. Entomol. Soc., London, 1888, pp. 247-267.